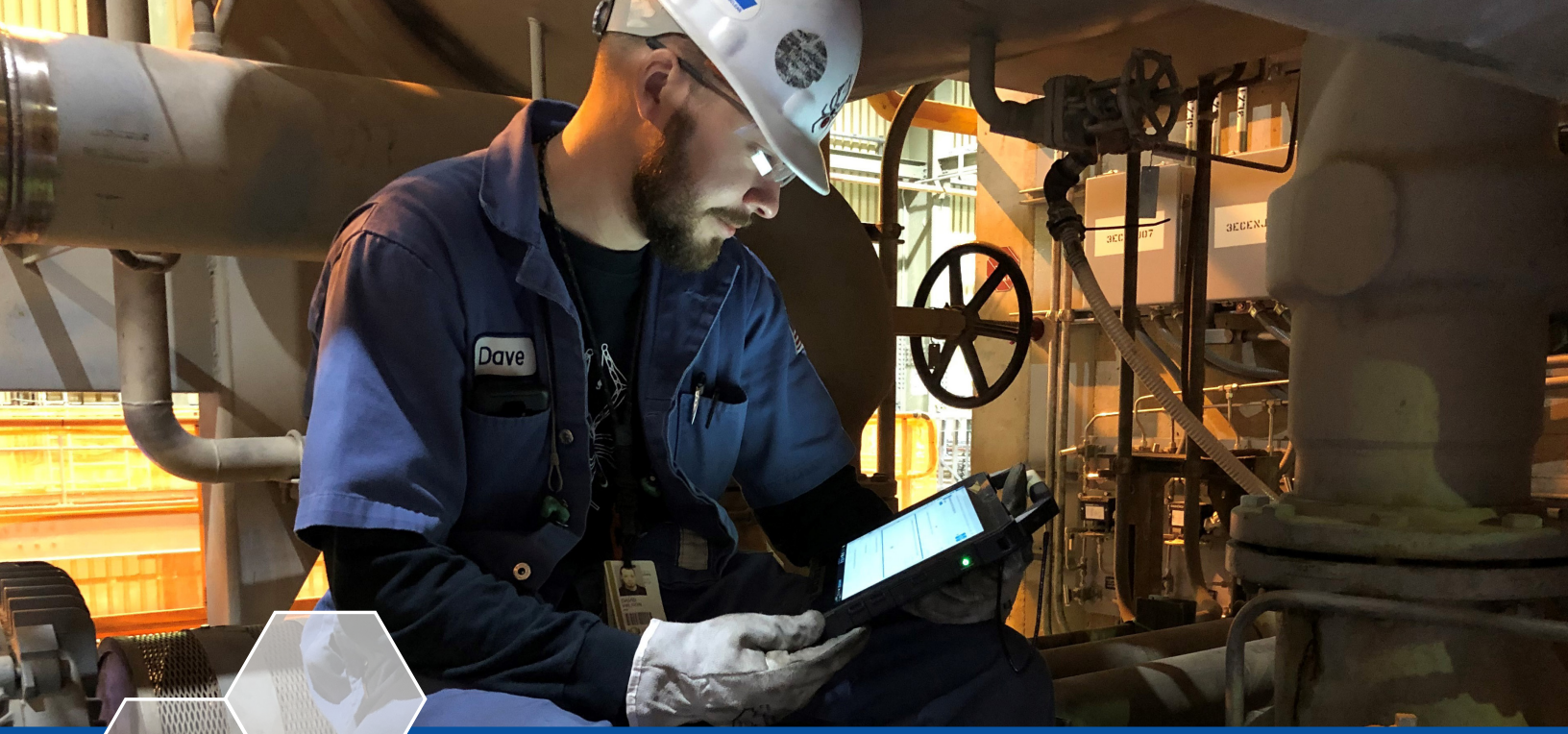

An operator at the Palo Verde Generating Station uses a dynamic instruction technology developed by INL and NextAxiom.

Dynamic Instructions Editing Tool Requirements (DIRECTOR) Initiative

Providing a Strategy for Digital Transformation Across Industries

In many industries, paper instructions guide all aspects of work. From how to disassemble a pump for maintenance to how to correctly open and close valves to prevent a tank from overflowing, paper instructions are commonplace. However, these paper instructions are difficult to update and search, increasing the number of potential errors and contributing to inefficiency.

To improve human performance, reduce worker burden and optimize work efficiency, many industries are switching to dynamic, or adaptive, instructions, i.e., instructions that determine what step is next based on a user input (e.g., recorded temperature) or system status (e.g., valve is closed). Unfortunately, this digital transformation can be a large undertaking, and it is difficult for companies to know where to start.

The DIRECTOR, or Dynamic Instructions Editing Tool Requirements, initiative is a one-of-a-kind initiative that addresses the need for consistent and clear guidelines when transitioning from paper to dynamic instructions.

Currently being adopted by vendors and electric utilities, DIRECTOR is unique because of the variety of organizations participating in its development and application. The DIRECTOR initiative includes collaborating members from power generating utilities; dynamic instruction technology, procedure support and software development vendors; and research organizations. Additionally, the DIRECTOR initiative has partnered with the Procedure Professionals Association, an organization dedicated to developing and exchanging technical information about professional procedures.

These collaborations ensure consistency between vendor and utilities, so no utility is tied to one vendor and both can adapt to new best practices.

The DIRECTOR initiative is not a digital tool. Instead, it provides a roadmap for the transition from paper to dynamic instructions, meaning that utilities will not have to start from scratch when they begin the process.

Key to this initiative was development of the Common Dynamic Instruction Model (CDIM), which was published in December 2020 by the Procedure Professionals Association. This vendor-

Idaho National Laboratory

and utility-generic model covers nearly all functionality types that a utility would want from a dynamic instruction solution. This underlying structure provides a starting point for utilities, requiring only customization of the tool based off the CDIM functional requirements, saving time and effort. Even more importantly, when a utility's vendor adheres to the CDIM, the utility reduces the risk of being tied to one vendor in the long run.

DIRECTOR-DEVELOPED STANDARDS

PPA AP-907-005.002, Dynamic Instruction Set Editor Functional Requirements and Implementation Considerations

PPA AP-907-005.003, Common Dynamic Instruction Model (CDIM)

PARTICIPATING VENDORS

- Absolute Consulting
- Accelerant
- ATOM Logic
- Atos
- ATR Inc
- BCP Engineers and Consultants
- BWXT
- DataGlance
- DevonWay
- DuraBante
- Framatome
- Honeywell Federal Manufacturing and Technologies
- Human-Factored Procedures
- Layline Associates
- Lean Power
- NextAxiom
- NuScale Power
- Procedure Solutions Management
- Tecnatom
- Volian
- Westinghouse

PARTICIPATING RESEARCH ORGANIZATIONS

- Brookhaven National Laboratory
- Consolidated Nuclear Security
- Electric Power Research Institute
- Fermi National Accelerator Laboratory
- Hanford Site
- Inje University
- Los Alamos National Laboratory
- Nevada National Security Site
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory
- Savannah River Nuclear Solutions
- Sandia National Laboratories
- Savannah River Site
- Texas A&M University

PARTICIPATING UTILITIES

- Ameren
- American Transmission
- Arizona Public Service
- Barakah Nuclear Power Plant
- Dominion Energy
- DTE Energy
- Duke Energy
- EDF Energy
- Energy Northwest
- Entergy
- Evergy
- Exelon
- Luminant
- Mixed-Oxide Fuel Fabrication Facility project
- Nawah Energy Company
- NextEra
- Ontario Power Generation
- Public Service Enterprise Group
- SCANA Energy
- Southern Nuclear
- South Texas Project Electric Generating Station
- Talen Energy
- TECO Energy
- Tennessee Valley Authority
- Xcel Energy

FOR MORE INFORMATION

Technical contact
Johanna Oxstrand
208-526-2064
johanna.oxstrand@inl.gov

www.inl.gov

A U.S. Department of Energy National Laboratory

20-50442_005_R0 (Updated: 2021)